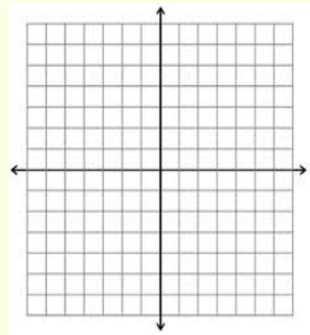
## Alg. 2 Warm Up # 3-5

1. Graph $y = \log_2(x + 4) - 3$



Solve:

2) $3^x = 9^{x+4}$

3) $2^{x+5} = \left(\frac{1}{8}\right)^{3x}$

4) Write in log form: $10^x = 1.45$

5) Approximate x to 3 decimal places.

## HW Questions:

Review & Preview

6-8. Make a table like the one below. Choose points in each of the locations listed at the top of the table and write in the coordinates of the points you have chosen.

| | Points on the $x$-axis | Points on the $y$-axis | Points on the $z$-axis | Points not on the $x$-, $y$-, or $z$-axes |
|---|---|---|---|---|
| 1st point | (0, 0, 0) | (0, 5, 0) | (0, 0, 4) | (1, 2, 3) |
| 2nd point | (1, 0, 0) | ( , , ) | ( , , ) | (-1, 7, -8) |
| 3rd point | (-7, 0, 0) | ( , , ) | ( , , ) | ( , , ) |
| 4th point | (10, 0, 0) | ( , , ) | ( , , ) | ( , , ) |

a. What do you notice about the coordinates of the points on the $x$-axis?

b. Make a conjecture about the coordinates of points that lie on any of the coordinate axes.

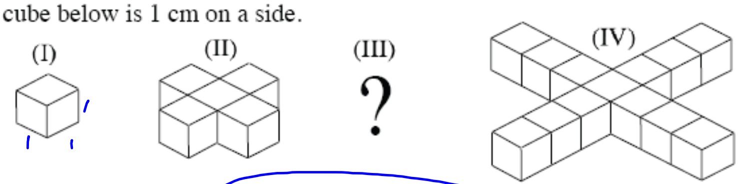
6-9. Solve the system of equations at right.

$3x + 8 = 2$
$7x + 3y = 1$

$3x = -6$
$x = -2$
Now plug in

$(-2, 5)$

6-10. Each cube below is 1 cm on a side.




a. Based on the pattern, find the volume of Figure III.

b. If the pattern continues, write an expression to represent the volume of Figure $N$. What kind of sequence is this? Arithmetic

| $n$ | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| $V=t(n)$ | 1 | 5 | 9 | 13 |

$+4$ $+4$ $+4$

$t(n) = dn + \text{zero term}$

$t(n) = 4n - 3$

6-11. Solve each exponential equation for $x$.

a. $10^x = 16$ b. $10^x = 41$ c. $3^x = 729$ d. $10^x = 101$

- in log form → $\log_{10} 16 = x$, now use calculator!

6-12. Rewrite each expression below as an equivalent expression without negative exponents.

a. $5^{-2}$ b. $xy^{-2}$ c. $(xy)^{-2}$ d. $a^3b^4a^{-4}b^6$

$\frac{1}{5^2}$

$\boxed{\frac{1}{25}}$

$a^3 \cdot a^{-4} \cdot b^4 \cdot b^6$

$a^{-1} \cdot b^{10}$

$\boxed{\frac{b^{10}}{a}}$

6-13. Multiply or divide and simplify each of the following expressions.

a. $\frac{3x}{x^2+2x+1} \div \frac{3}{x^2+2x+1}$

$$\frac{3x}{x^2+2x+1}\cdot\frac{x^2+2x+1}{3}$$

$$\frac{\cancel{3}x\,\cancel{(x^2+2x+1)}}{\cancel{3}\,\cancel{(x^2+2x+1)}}$$

$$\boxed{x}$$

b. $\frac{3}{x-1}\cdot\frac{2}{x-2}$

$$\boxed{\frac{6}{(x-1)(x-2)}}$$

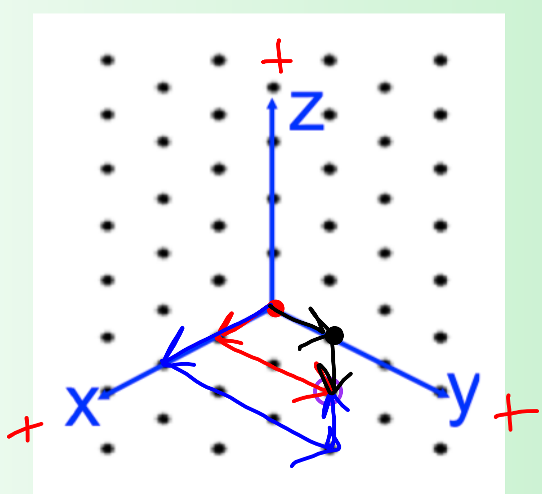
## Yesterday's CP's (Green)

Go get your team's 3-D models.

6) (0, 1, -1)

(1, 2, 0)

(2, 3, 1)



Describe the solutions to   $x = 3$

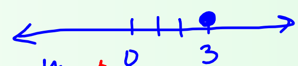
Describe the solutions to $6x - 8y = 48$

How would you know if a certain point is a solution?

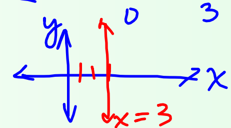
Is $(3, -\frac{15}{4})$ a solution?

Describe the solutions to   $x = 3$

A point on the number line:

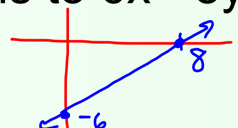



A vertical line in the x-y plane:




Describe the solutions to $6x - 8y = 48$

A line in the x-y plane:




How would you know if a certain point is a solution? Plug in and see if it works!

Is $(3, -\frac{15}{4})$ a solution?

$$6(3) - 8\left(-\frac{15}{4}\right) \stackrel{?}{=} 48$$

$$18 + 30 = 48$$

$$48 = 48 \checkmark$$

# Week 3 Classwork

Warm up

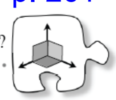
Yellow 5.2.4 revised

Blue Composites & Inverses

CP's 6- # 1--->6 (Green)

CP's: 6- #16 ---> 20 (own paper) p. 261

## 6.1.2 How can I graph an equation in three dimensions?



Graphing Equations in Three Dimensions

In the past, you have used the two-dimensional Cartesian coordinate system ($x$- and $y$-axes) to graph equations involving two variables. In Lesson 6.1.1, you used a three-dimensional coordinate system to plot points. Today you will use the three-dimensional coordinate system to graph equations that have three variables. As you are working through the lesson, use the following questions to help focus your discussion:

How can we use what we know about graphing in two dimensions to help us graph in three dimensions?

What does a solution to a three-variable equation represent?

6-16. Consider the equation $\boxed{5x+8y+10z=40}$.

a. Discuss with your team what you think the shape of the graph would be. Explain how you decided.

b. Is the point $(4, 5, -2)$ a solution to the equation $5x+8y+10z=40$? Justify your answer. ← plug into →

c. Your team will be given a list of points to test in the equation. Plot each point that makes the equation true on the three-dimensional graphing tool your teacher has set up.

d. Now examine the solutions displayed on the graphing tool. With your team, discuss the questions below. Be ready to share your discoveries with the class.

- Are there any points that you suspect are solutions, but do not have a point showing on the graph?
- How many solutions do you think there are?
- Are there any points showing that you think are not solutions? Explain.
- What shape is formed by all of the solutions? That is, what is the shape of the graph of $5x+8y+10z=40$?

6-17. How can you graph an equation like $12x + 4y + 5z = 60$ in three dimensions? To come up with a strategy to graph a three-variable equation, look at the strategies you can use to graph a two-variable equation in two dimensions. For example, consider $5x + 8y = 40$.

a. What is the shape of the graph of $5x + 8y = 40$? How can you tell?

b. With your team, brainstorm all of the strategies you could use to graph $5x + 8y = 40$. Which strategy do you prefer? Why?

6-18. Now you will work with your team to graph $12x + 4y + 5z = 60$.

a. What do you think it will look like?

b. Which of the strategies you used to graph a two-variable equation in problem 6-17 can be used to graph this three-variable equation? Work with your team to find a strategy and then graph $12x + 4y + 5z = 60$ on your isometric dot paper. Be prepared to share your strategy with the class.

6-19. Use your new strategy to graph each of the following equations in three dimensions.

a. $13x+4y+5z=260$

b. $12x-9y+108=0$

6-20. Consider the graph of $x=4$ for each of the following problems.

a. Graph the solution to $x=4$ in one dimension (on a number line).

b. Graph the solutions to $x=4$ in two dimensions (on the $xy$-plane).

c. Graph the solutions to $x=4$ in three dimensions (in the $xyz$-space).

HW: 6 -

# 21 ---> 26